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(54) Antimicrobial shield

(57) A shield for use with a telephone handset or like apparatus comprising a piece (1) of material having sound transmitting qualities, the piece of material being treated with an antimicrobial compound which provides the treated material with antimicrobial qualities and means (9) for attachment of the piece of material to the telephone handset or like apparatus.

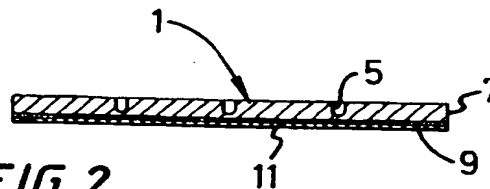
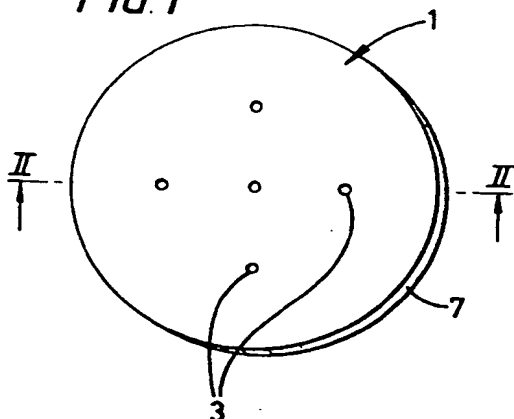


FIG. 2

FIG. 1



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Description

[0001] This invention relates to an antimicrobial shield and more particularly to such a shield for telephone mouthpieces, earpieces or other like devices.

[0002] The problem exists with items which are used close to the human respiratory systems, when these items are used by a large number of different people, that bacteria are transmitted from one user to the item, the bacteria then remaining in situ ready to infect other users.

[0003] Attempts in the past have been made to overcome this problem, to some extent, by regular sterilization and cleaning of the items and while this can cut down on the amount of bacteria present in the long term, it does not protect the user from bacteria which may be deposited on the item between sterilizations.

[0004] Particular problems arise when the items are public telephones which can be used very frequently by any one. It is aggravated by the very close proximity of the mouthpiece with the mouth and actual contact between the users ear and the earpiece.

[0005] The present invention seeks to provide a shield which can be used in conjunction with telephones and like apparatus and which will inhibit or kill bacteria coming in contact with it but will readily pass sound therethrough.

[0006] According to the invention there is provided a shield for use in a telephone handset or like apparatus comprising a piece of material having sound transmitting qualities, the piece of material being treated with an antimicrobial compound which provides the treated material with antimicrobial qualities and means for the attachment of the piece of material to the telephone handset or like apparatus.

[0007] The piece of material may be cut from a sheet of the material or may be injection moulded.

[0008] The piece of material may be formed from an expanded thermoplastic foam such as PVC, Flexible Pu or PVA or of natural or synthetic rubber or of other suitable fabric or paper having the requisite sound transmitting properties.

[0009] The shield may comprise a disk of the said material adapted to the dimensions of a telephone ear piece or mouth piece.

[0010] The means for attachment may comprise a low peel adhesive coated on one side of the said material and may be covered with a release sheet.

[0011] The sheet may comprise PVC mixed with Chlorohexidine, and Polyethylene Glycol with the possible addition of Azodicarbonate

[0012] The piece of material may be formed with a pattern of indentations and/or may incorporate a coloured dye or ink sensitive to ambient conditions such that the colour will fade over a predetermined period of time to indicate the need for replacement of the shield.

[0013] The antimicrobial material may be any suitable material which has the property of being able to diffuse or migrate to the surface of the sheet material.

[0014] The invention will now be described in greater detail, by way of example, with reference to the drawings, in which:-

Figure 1 is a perspective view of one form of shield in accordance with the invention, and

Figure 2 is a section of the shield of Figure 1 taken on the line II - II, and

Figure 3 is a perspective view of a telephone handset fitted with a shield as shown in figures 1 and 2.

[0015] The drawings show one example of a shield in accordance with the invention. It comprises a disc 1 of a foam material to which has been added, in the course of the production of the base material, an antimicrobial material. Examples of the material used will be given hereafter.

[0016] In the example shown, the surface is printed with indicia 3, which, in addition to the use of inks, may be indented as shown more particularly at 5 in figure 2.

The periphery 7 of the disc 1 is coated on the underside with a low peel adhesive 9. Other methods of securing the disc 1 will also be discussed hereafter. Preferably the underside of the disc 1 is covered with a release sheet 11, at least over the areas coated with adhesive.

[0017] In use, the release sheet 11 is peeled from the disc 1 and the disc is pressed firmly over the mouthpiece 21 of a handset 20. It will be understood that while the use of the shield is shown in figure 3 in connection with the mouth piece, it could also be used on the earpiece 23. Because of the nature of the adhesive, when it is desired to replace a used disk with a fresh one, the old disk can be simply peeled from its location and a new disk applied.

[0018] Other methods of attachment may be used. For example, the disc could be produced from heavily plasticised PVC or Polypropylene so that it exhibits self stick properties. Otherwise, the disc could, instead of being cut from sheet material, be injection moulded with studs which can fit snugly into the holes or apertures in a telephone mouth or ear piece.

[0019] Examples of the process for producing the shields will now be considered:-

Example 1

[0020] A batch of antimicrobial material was prepared by mixing 10 grams of Chlorohexidine and 20 millilitres of Polyethylene Glycol with a molecular weight of 400, 25 grams of Azodicarbonate with 945 grams of PVC. The resultant mix was coated onto a release paper and expanded under heat to produce a sheet of expanded foam material of the closed cell type. This sheet was then cut to provide a number of disks, suitably of 33mm diameter which is the standard size of a telephone mouth or earpiece.

Example 2

[0021] A batch of antimicrobial material was prepared by mixing 10 grams of Chlorohexidine and 20 grams of Polyethylene Glycol with a molecular weight of 400, with 970 grams of PVC. The resultant mix was coated onto a release paper and expanded under heat to produce a sheet of expanded foam material of the closed cell type. This sheet was then cut to provide a number of disks, suitably of 33mm diameter.

[0022] In all of the above examples, a high level of plasticizer was used so as to render the surface in contact with the release sheet self adhesive thus avoiding the necessity of using an additional adhesive for fixing of the disks.

[0023] There are a number of possibilities to enhance the disks in use.

[0024] Firstly, the disks may be perforated to increase sound transmission although as later tests have shown, this would not normally be necessary.

[0025] The discs could be additionally impregnated with an antiseptic fragrance.

[0026] The disks could incorporate or be printed with a dye or ink which is sensitive either to air or light such that the colour will fade when the disk needs to be replaced.

[0027] Indentations, such as those shown at 5 in figure 2, could be produced by printing the material before foaming with a pattern of inhibitor material prior to the application of the disk material so that foaming at these areas is inhibited. The above described disk examples are particularly intended to combat Gram positive and Gram negative bacteria and accordingly, samples made in accordance with the above examples were tested for effectiveness:-

Antimicrobial Testing

[0028] Petri dishes containing nutrient agar were seeded with one of the following test bacteria:

Escheria coli NCTS 8196
Escheria coli NCTS 9484
Escheria coli NCTS 10418
Staphylococcus aureus NCTC 4163
Staphylococcus aureus NCTC 8532
Staphylococcus aureus NCTC 8625
Listeria Wild strain
Salmonella NCTC 4776

[0029] A 1 cm square sample of the antimicrobial disk was placed aseptically onto the surface of each seeded dish. The dishes were then placed in a refrigerator at 4 degrees Centigrade overnight to allow the antimicrobial agent to migrate into the agar. The dishes were then removed from the refrigerator and examined for growth inhibition, the inhibition zones being measured and photographed.

[0030] The table below shows the inhibition zones on tests conducted by The Royal Hampshire County Hospital (Department of Microbiology). As can be seen from this table, the tested samples showed excellent antimicrobial properties.

ORGANISM	STRAIN	COUNT	ZONE IN MM	ZONE IN MM	DTE READ
			5/101	5/103	
E.COLI	8196	8.8x10	5	2	28.11.93
S.AUREUS	8532	3.2x10	1	1	28.11.93

(continued)

ORGANISM	STRAIN	COUNT	ZONE IN MM	ZONE IN MM	DTE READ
			5/101	5/103	
LEGIONELLA	WILD		15	16	27.04.94
S.AURREUS	8532	2.4x10	13	3	24.02.95
E. COLI	8196	6.8x10	16	6	24.02.95
MRSA	11940		6	2	28.09.95

Acoustic Testing

[0031] Testing was also carried out to determine the sound transmissive properties of the pads.

[0032] A sample circular pad of 40mm diameter was cut from a strip of foam plastics material prepared as above in Example 1. The pad was fitted centrally over the apertures in the mouthpiece of a telephone handset so that all apertures were covered. The pad was retained in place by a "Prittstick" adhesive, the handset being an Eagle type TH7SP.

[0033] The handset was held vertically using a retort stand 15cm in front of a Tannoy loudspeaker (cabinet dimensions 30cm by 50cm) with the handset mouth piece facing towards the loud speaker opposite to its centre point.

[0034] The output signal from the microphone in the handset was measured using a Bruel and Kajer sound level meter type 2203 fitted with octave band filters type 1613. The loudspeaker was fed with a white noise signal from a Bruel and Kajer sine-random signal generator and the signal from the mouthpiece microphone was measured in octave bands 125Hz to 8000Hz. The pad was then removed from the mouthpiece and the measurements were repeated.

[0035] The results showed that there was no measurable difference in any of the seven octave frequency bands between the sound pressure measurement with or without the pad. This proves that any differences were less than one decibel, which was the level of precision of these tests, and would be completely unnoticeable to the human ear.

[0036] While the above embodiments have been described in relation to the positioning of antimicrobial discs on a telephone mouthpiece, it will be appreciated that it could equally well be used on the earpiece. Instead of the use of disks just covering the apertures in the mouth or earpiece, a shroud like cover could be provided for the whole of the mouth or earpiece.

[0037] Alternatively, the shield could be fitted inside the handset if the handset was suitably modified during manufacture to receive it.

[0038] It will also be appreciated that the invention is equally applicable to like apparatus. Such apparatuses include hand microphones, stage and public address microphones and headsets.

Claims

1. A shield for use with a telephone handset or like apparatus comprising a piece (1) of material having sound transmitting qualities, the piece (1) of material being treated with an antimicrobial compound which provides the treated material with antimicrobial qualities and means (9) for attachment of the piece (1) material to the telephone handset (20) or like apparatus.

2. A shield as claimed in claim 1, wherein the piece (1) of material is cut from a sheet of the material.

3. A shield as claimed in claim 1, wherein the piece (1) of material is injection moulded.

4. A shield as claimed in claim 1, 2, or 3, wherein the piece (1) of material is formed from an expanded thermoplastics foam.

5. A shield as claimed in claim 1, 2, or 3, wherein the piece (1) of material is formed of natural or synthetic rubber.

6. A shield as claimed in claim 1, 2, or 3, wherein the piece (1) of material comprises a fabric or paper having the requisite sound transmitting properties.

7. A shield as claimed in any preceding claim, wherein the shield comprises a disk (1) of the said material adapted to the dimensions of a telephone ear piece (22) or mouth piece (21).

8. A shield as claimed in any preceding claim, wherein the means for attachment comprises a low peel adhesive (9)

coated on one side of the said piece (1) of material.

9. A shield as claimed in claim 8, wherein the low peel adhesive (9) is covered with a release sheet (11).

5 10. A shield as claimed in any preceding claim, wherein the material comprises PVC mixed with Chlorohexidine, and Polyethylene Glycol.

11. A shield as claimed in claim 10, wherein the material additionally comprises Azodicarbonate.

10 12. A shield as claimed in any preceding claim, wherein the piece (1) of material is formed with a pattern of indentations (3).

15 13. A shield as claimed in any preceding claim, wherein the piece (1) of material incorporates a coloured dye or ink sensitive to ambient conditions such that the colour will fade over a predetermined period of time to indicate the need for replacement of the shield.

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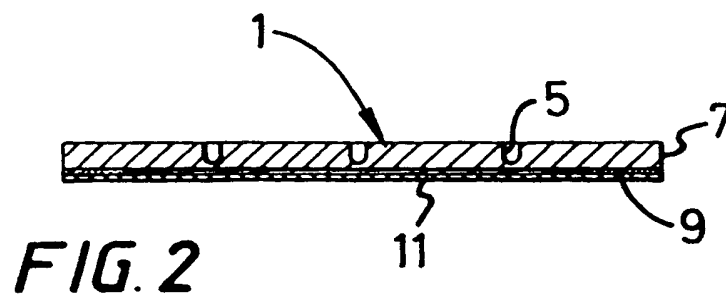
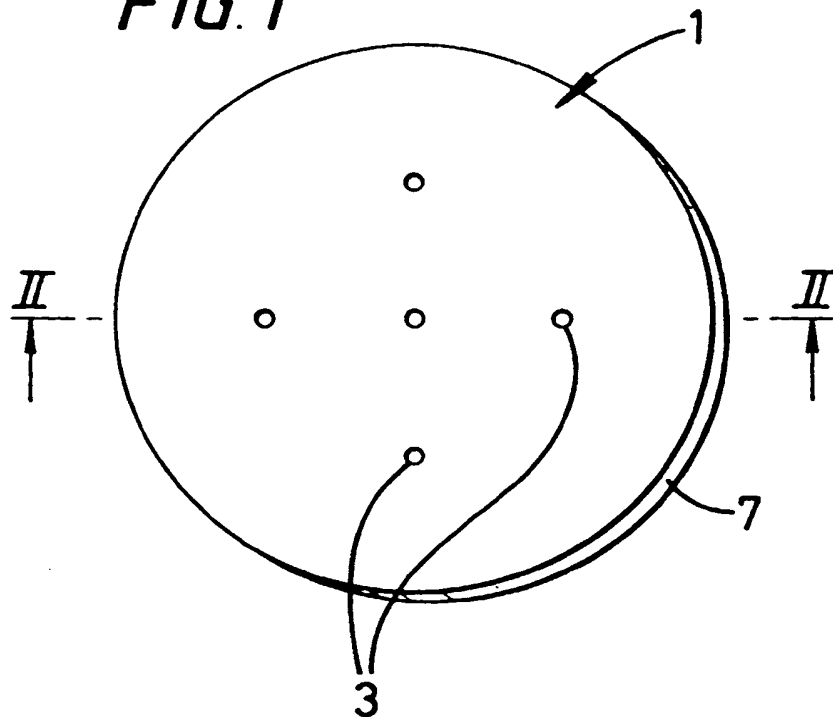
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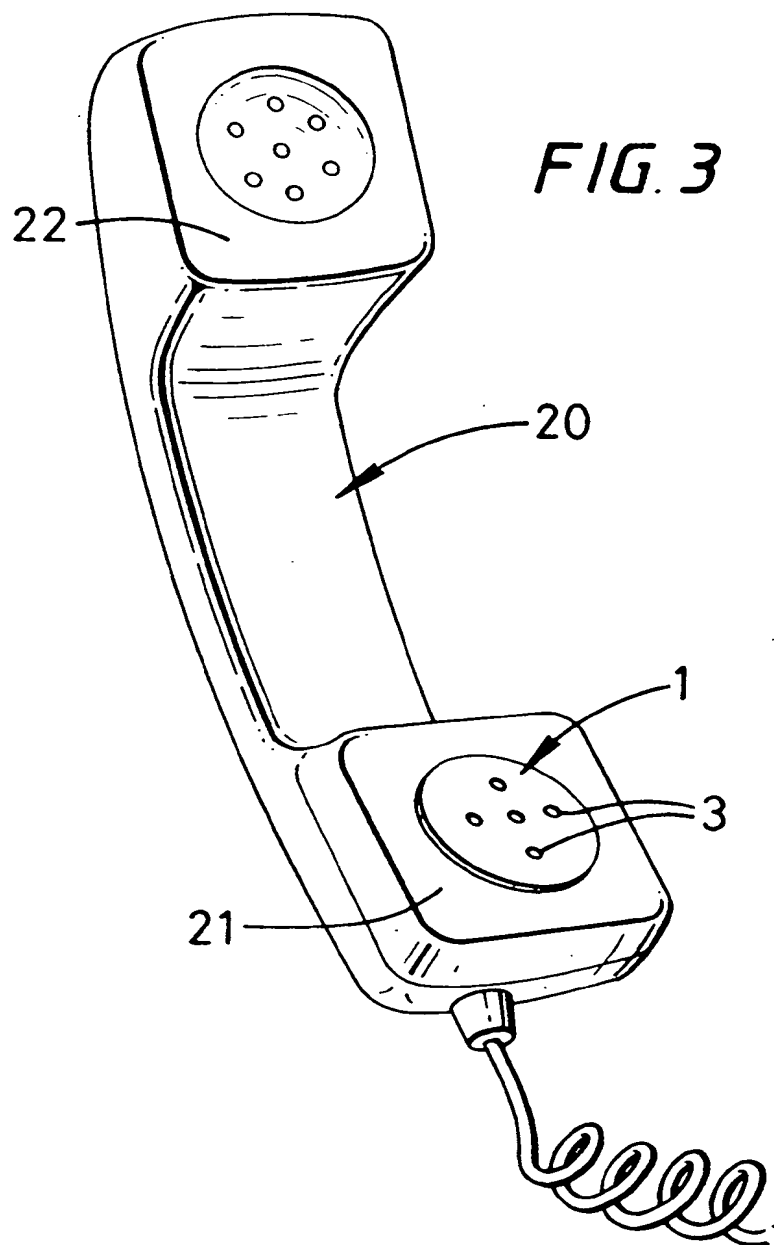
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FIG. 1







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EUROPEAN SEARCH REPORT

Application Number
EP 99 30 1972

DOCUMENTS CONSIDERED TO BE RELEVANT			Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
Category	Citation of document with indication, where appropriate, of relevant passages			
X	EP 0 262 921 A (PHONESHIELDS LTD) 6 April 1988 (1988-04-06) * column 1, line 57 - column 2, line 1 * * column 3, line 10 - line 22 * * claim 1 *	1,3,10,13	H04R1/12	
X	FR 2 634 337 A (KATO KENKYUSHO YK) 19 January 1990 (1990-01-19) * abstract; figures *	1,6,12		
X	FR 2 668 014 A (ROBICHON CHANTAL) 17 April 1992 (1992-04-17) * page 1, line 14 - line 24; figures *	1,7-9		
X	FR 2 654 569 A (FARCHY ALBERT) 17 May 1991 (1991-05-17) * page 1, line 29 - line 31 *	1,2,10		
X	FR 2 674 713 A (RAPHOSE JEAN EDOUARD) 2 October 1992 (1992-10-02) * page 2, line 9 - line 13 *	1,4,5		
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.6)	
			H04R H04M	
Place of search THE HAGUE		Date of completion of the search 12 July 1999	Examiner Gastaldi, G	
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date O : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document</p>				

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 99 30 1972

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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12-07-1999

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 0262921	A	06-04-1988	NONE	
FR 2634337	A	19-01-1990	NONE	
FR 2668014	A	17-04-1992	NONE	
FR 2654569	A	17-05-1991	NONE	
FR 2674713	A	02-10-1992	NONE	

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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